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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/789,485

02/27/2004

Thilo Stolze

074313.0105

7994

7590  
Andreas Grubert  
Baker Botts L.L.P.  
One Shell Plaza  
910 Louisiana  
Houston, TX 77002-4995

12/27/2006

EXAMINER

ARENA, ANDREW OWENS

ART UNIT

PAPER NUMBER

2811

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

12/27/2006

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/789,485	<b>Applicant(s)</b> STOLZE, THILO	
	<b>Examiner</b> Andrew O. Arena	<b>Art Unit</b> 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-5,8,9 and 11-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5,8,9 and 11-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 October 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/09/2006 has been entered.

### ***Drawings***

Fig 4 is objected to because it does not clearly depict how the substrate is segmented. Apparently 102 represents the substrate, which is segmented into separate substrate regions 103, 104, 105 (specification ¶38 & ¶32). Although the figure has dotted lines between regions 103, 104, and 105, it seems they are all connected to substrate 102 and to each other. Compare with Fig 2, which clearly shows substrate regions 3, 4, and 5 separately; entirely consistent with Fig 1. It seems that in Fig 4, label 102 should actually be labeled 120 (compare 20 in Figs. 1-2) and that the sections 103, 104, and 105 should be more clearly separated from one another.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance. See MPEP § 608.02(p).

### ***Claim Objections***

Claim 1 is objected to because the recitation “between two adjacent substrates” has no antecedent basis and is confusing. Claim 1 defines only a single substrate which is “divided into a plurality of substrate regions” (see also spec); it seems said recitation should be changed to “between two adjacent substrate regions”.

Claim 1 is objected to because the recitation “a plurality of semiconductor components situated on a substrate” is confusing in that applicant’s invention defines only one such component on each physical substrate. Although applicant has the right to choose just about any language desired, the choice of the term “substrate” to refer to what are actually physically separate substrates (spec ¶32 and Fig 1) seems to serve no other purpose besides obfuscation. The clarity of claim 1 would be vastly improved, and the scope of coverage essentially unchanged, if said recitation were changed to “a plurality of semiconductor components situated on a plurality of substrate regions”, or even better, to “a plurality of semiconductor components, each one situated on one of a plurality of substrate regions”. See MPEP § 2173.02(¶1). See also claim 14.

Claim 12 is objected to because there is insufficient antecedent basis for “the housing”, since the claim has only defined a “module housing” (see claim 2). Said recitation should be replaced with “the module housing” (see claims 8 & 9).

Claim 12 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 2. See MPEP § 706.03(k). One appropriate correction is to cancel claim 12.

Appropriate correction of claims 1 and 12 is required.

***Claim Rejections - 35 USC § 102***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-3, 8, 9, 13-17 and 19-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Fromme (EP 1 083 599).

Regarding Fromme, the English-Language section "novelty" is relied upon.

**Re claim 1**, Fromme discloses (Fig 3) a power semiconductor module (In 1) comprising a plurality of semiconductor components (21) situated on a substrate (the collection of all 20s), wherein

the substrate is divided into a plurality of separate substrate regions (20), wherein in between two adjacent substrates (either side of labeled 20) an area being coplanar with said adjacent substrate regions is defined; and

one or a plurality of connecting elements (labeled 20) are arranged in said coplanar area, wherein said connecting elements are designed to prevent a deformation of one substrate region to continue to an adjacent substrate region (Fromme is capable of the intended use - see MPEP § 2112.01 and FP 7.37.09).

**Re claim 2**, Fromme discloses (Fig 3) the connecting regions are formed by recesses (between circular portions of 31) in a module housing (32) enclosing said substrate portions.

**Re claim 3**, Fromme discloses (Fig 3) the material recesses are slotted (recess between circular portions of 31).

**Re claims 8, 9 & 12**, Fromme discloses (Fig 3) the module housing, at least in the regions of the substrate regions, is such that it acts on the substrate regions with a spring force (solids have inherent elastic modulus, and exert a spring force upon contact).

**Re claim 13**, Fromme discloses (Fig 3) the power semiconductor module has a housing (32), which, in the region between the substrate regions, has action points for a mechanical pressure application of the connecting regions (any point between substrate regions can be regarded as an action point for a mechanical pressure application), and the housing applies pressure to the individual substrate regions (ln 5-6).

**Re claim 14**, Fromme discloses (Fig 3) a power semiconductor module (ln 1) comprising

a plurality of substrate elements (20) having a top and bottom surface and sidewalls, each substrate element comprising a semiconductor component (21) arranged on the top surface of a substrate element;  
one or a plurality of connecting regions (31) arranged adjacent opposing sidewalls of two adjacent substrate elements, wherein said connecting elements are designed to prevent a deformation of one substrate region to continue to an adjacent substrate region (Fromme is capable of the intended use - see MPEP § 2112.01 and FP 7.37.09).

**Re claim 15**, Fromme discloses (Fig 3) a module housing (32) enclosing said plurality of substrate elements.

**Re claim 16**, Fromme discloses (Fig 3) the connecting elements are formed by recesses (between circular portions of 31) in the module housing.

**Re claim 17**, Fromme discloses (Fig 3) the material recesses are slotted (recess between circular portions of 31).

**Re claim 19**, Fromme discloses (Fig 3) the module housing, at least in the regions of the substrate regions, is such that it acts on the substrate regions with a spring force (solids have inherent elastic modulus, and exert a spring force upon contact).

**Re claims 20 & 22**, Fromme discloses (Fig 3) a heat sink (30) having a fiat (top) surface, wherein a bottom surface of the plurality of substrate elements (20) and said plurality of connecting regions are arranged on said fiat surface.

**Re claim 21**, Fromme discloses (Fig 3) the module housing (32) in a region between the substrate elements comprises action points for a mechanical pressure application of the connecting elements (any point between substrate regions can be regarded as an action point for a mechanical pressure application), and the housing applies pressure to the individual substrate regions (In 5-6).

**Re claim 23**, Fromme discloses (Fig 3) a power semiconductor module (In 1) comprising:

- a heat sink (30) having a fiat (top) surface;

- a plurality of substrates (either side of labeled 20) arranged on the fiat surface of the heat sink;

- a plurality of semiconductor components (21) arranged on the substrates;

- on or a plurality of connecting regions (labeled 20) arranged directly on the fiat surface of the heat sink between adjacent substrate regions, wherein the connecting

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regions are designed to prevent a deformation of one substrate region to continue to an adjacent substrate region (Fromme is capable of the intended use - see MPEP § 2112.01 and FP 7.37.09).

### ***Claim Rejections - 35 USC § 103***

Claims 4, 5, 11, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fromme as applied to claims 1, 2, and 14 above, and further in view of Mikio (JP Pub 2001-118987).

**Re claims 4, 5 & 18**, Fromme differs from the claimed invention only in not expressly disclosing the substrate is a ceramic.

Mikio discloses an analogous device on a ceramic substrate.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made that in Fromme, in view of Mikio, the substrate is ceramic; at least for high heat dissipation (JPO machine translation of Mikio: ¶3).

**Re claim 11**, Fromme discloses (Fig 3) the module housing, at least in the regions of the substrate regions, is such that it acts on the substrate regions with a spring force (solids have inherent elastic modulus, and exert a spring force upon contact).

### ***Response to Arguments***

Applicant's arguments filed 10/09/2006 have been considered but are moot in view of the new grounds of rejection.



***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Applicant's claimed "connecting element" can be read onto the encapsulant between chips in any of these cited references.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

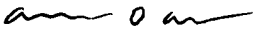
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

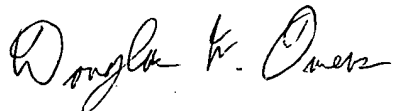
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew O. Arena whose telephone number is 571-272-5976. The examiner can normally be reached on M-F 8:30-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard T. Elms can be reached on 571- 272-1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Andrew O Arena  
15 December 2006

 12/21/06

DOUGLAS W. OWENS  
PRIMARY EXAMINER